Reconnaissance Test and Support for Acoustic Measurements in Geologic Clutter

Michael T. Sundvik
Naval Undersea Warfare Center Division
1176 Howell St
Newport RI 02841
phone: (401) 832-8680 fax: (401) 832-7477 email: SundvikMT@npt.nuwc.navy.mil

Award Number: N00014 00WX20966

LONG-TERM GOALS

Characterize the nature of low- to mid- frequency acoustic reverberation data relative to specific geologic features mapped in the New Jersey Shelf STRATAFORM area leading to the fundamental knowledge of the causes of clutter in low and mid frequency monostatic and multistatic sonar systems.

OBJECTIVES

Provide calibrated, well-located acoustic reconnaissance reverberation data from low and mid-frequency systems relative to several mapped features in the New Jersey STRATAFORM area. Reverberation returns mapped into geographic coordinates will be used to guide the placement of resources in the main acoustic experiments to be conducted beginning in FY01.

APPROACH

Provide Test planning and Ship scheduling support to conduct of a reconnaissance test to be conducted prior to the April-May 2001 experiments. Modify existing TRAFS system software to provide a specialized data collection system which allows navigation, timing, array heading information and calibrated beam reverberation data time series for the towed array receiver of a US Navy surface ship to be utilized by a MIT workstation for the determination of geographic location of reverberation highlights. Provide ship, fleet interaction, installation, and logistic support for first Main Acoustic experiment to be conducted April-May 2001. Participate in Geologic Clutter workshops and meetings to provide coordination and information in planning for experiments, and data exchange.

RESULTS

Participation in LWAD 00-2 aboard USS O'BANNON allowed testing of software developed for extraction of meaningful data from shipboard systems. Several changes to software resulted in a more user-friendly and robust data interface. In addition, calibrated data from the towed array at all settings was obtained which will be used to constrain and prepare final software set for full reconnaissance testing to be done in FY01.

USS O'BANNON, Mayport, FL (Navy File Photo)

IMPACT/APPLICATIONS

A reconnaissance test to be conducted in the April 2001 timeframe will produce data to be used to determine distribution of reverberation and clutter in a "through the system" sense. Scientifically, the significance of low frequency (100 to 1000 Hz) and mid-frequency (2000 to 5000 Hz) acoustic reverberation energy from a variety of geologic features in shallow water will be mapped, and used to guide further experimentation to determine the causes of reverberation/clutter in shallow water environments.

TRANSITIONS

Data will be used to guide future classification efforts for bottom features in shallow water environments at low frequencies and mid frequencies. Fundamental research into causes of low frequency reverberation will also benefit.

RELATED PROJECTS

Littoral Water Advanced Development (LWAD). Sea test planning and environmental data collection were supported under LWAD during the LWAD 00-2 experiment conducted May 24-27 2000.

Environmentally Adaptive Sonar Technology (EAST). The 6.3-EAST program will benefit from analyses conducted on data collected using the AN-SQS-53C during the reconnaissance test by improvements to bottom backscattering and bottom loss estimation from specific geologic features.

Multistatic ASW Capability Enhancement (MACE) Reverberation data collected during the Geologic Clutter experiments pertains to the frequencies of interest to the MACE program, and employs bistatic geometries.